CLAIMS

[1] A liquid type identification apparatus for a light oil, for identifying the type and distillation properties of a light oil, comprising:

a liquid type identification chamber for a light oil, for allowing a light oil to be identified, which has been introduced into a liquid type identification apparatus body, to temporarily stay therein;

a liquid type identification sensor heater provided within the light oil type identification chamber; and

a liquid temperature sensor spaced by a given distance from the liquid type identification sensor heater and provided within the light oil type identification chamber,

the liquid type identification sensor heater comprising a heater and an identification liquid temperature sensor provided in the vicinity of the heater,

the liquid type identification apparatus further comprising an identification control unit;

the identification control unit being constructed

that a pulse voltage is applied to the liquid type identification sensor heater for a predetermined period of time, and the light oil to be identified which temporarily stays within the liquid type identification chamber for a light oil is heated by the heater, and the liquid type is identified with a voltage output difference V0, corresponding to a temperature difference between the initial temperature and the peak temperature of the identification liquid temperature sensor.

[2] The liquid type identification apparatus for a light oil according to claim 1, characterized in that the voltage output difference V0 is the difference in voltage between an average initial voltage V1 determined by sampling the initial voltage before the application of the pulse voltage by a predetermined number of times and an average peak voltage V2 determined by sampling the peak voltage after the application of the pulse voltage by a predetermined number of times, that is,

$V0 = V2 - V1$.

[3] The liquid type identification apparatus for a

light oil according to claim 1 or 2, characterized in that the identification control unit is constructed so that the type of the light oil is identified using the voltage output difference V0 obtained for the light oil to be identified,

based on calibration curve data as a correlation between temperature and voltage output difference, for predetermined reference light oils previously stored in the identification control unit.

[4] The liquid type identification apparatus for a light oil according to any one of claims 1 to 3, characterized in that

the identification control unit is constructed so that a liquid type voltage output Vout for the voltage output difference V0 at a measuring temperature for the light oil to be identified is corrected in a correlation with the output voltage for the voltage output difference at the measuring temperature for a predetermined threshold reference light oil.

[5] The liquid type identification apparatus for a light oil according to any one of claims 1 to 3,

characterized in that the liquid type identification sensor heater is a laminated liquid type identification sensor heater in which a heater and an identification liquid temperature sensor are laminated through an insulating layer.

[6] The liquid type identification apparatus for a light oil according to any of claims 1 to 5, characterized in that the heater and identification liquid temperature sensor in the liquid type identification sensor heater each are constructed so as to come into contact with the light oil to be identified through a metallic fin.

[7] The liquid type identification apparatus for a light oil according to any of claims 1 to 6, characterized in that the liquid temperature sensor is constructed so as to come into contact with the light oil to be identified through the metallic fin.

[8] A liquid type identification method for a light oil, for identifying the type and distillation properties of a light oil, comprising the steps of:

applying a pulse voltage for a predetermined

period of time to a liquid type identification sensor heater comprising a heater and an identification liquid temperature sensor provided in the vicinity of the heater;

heating the light oil to be identified by the heater; and

identifying the liquid type with a voltage output difference V0, corresponding to a temperature difference between the initial temperature and the peak temperature of the identification liquid temperature sensor.

[9] The liquid type identification method for a light oil according to claim 8, characterized in that the voltage output difference V0 is the difference in voltage between an average initial voltage V1 determined by sampling the initial voltage before the application of the pulse voltage by a predetermined number of times and an average peak voltage V2 determined by sampling the peak voltage after the application of the pulse voltage by a predetermined number of times, that is, $V0 = V2 - V1$.

[10] The liquid type identification method for a light oil according to claim 8 or 9, characterized in that the identification control unit is constructed so that the type of the light oil is identified using the voltage output difference V0 obtained for the light oil to be identified,

based on calibration curve data as a correlation between temperature and voltage output difference, for predetermined reference light oils previously stored in the identification control unit.

[11] The liquid type identification method for a light oil according to any one of claims 8 to 10, characterized in that

a liquid type voltage output Vout for the voltage output difference V0 at a measuring temperature for the light oil to be identified is corrected in a correlation with the output voltage for the voltage output difference at the measuring temperature for a predetermined threshold reference light oil.

[12] The liquid type identification method for a light oil according to any one of claims 8 to 11,

characterized in that the liquid type identification sensor heater is a laminated liquid type identification sensor heater in which a heater and an identification liquid temperature sensor are laminated through an insulating layer.

[13] The liquid type identification method for a light oil according to any of claims 8 to 12, characterized in that the heater and identification liquid temperature sensor in the liquid type identification sensor heater each are constructed so as to come into contact with the light oil to be identified through a metallic fin.

[14] The liquid type identification method for a light oil according to any of claims 8 to 13, characterized in that the liquid temperature sensor is constructed so as to come into contact with the light oil to be identified through the metallic fin.

[15] A liquid type identification apparatus for an automotive light oil, for identifying the type and distillation properties of the light oil, comprising:

the liquid type identification apparatuses for a light oil according to any of claims 1 to 7 which is provided within a light oil tank or on the upstream side or downstream side of a light oil pump.

[16] A liquid type identification method for an automotive light oil, for identifying the type and distillation properties of the light oil, comprising:

identifying the type and distillation properties of the light oil in a light oil tank or on the upstream side or downstream side of a light oil pump, by using any of the methods for identifying the liquid type of the light oil according to any of claims 8 to 14.

[17] An automotive exhaust gas reduction apparatus comprising:

the above liquid type identification apparatuses for a light oil according to any of claims 1 to 7, which is provided within a light oil tank or on the upstream side or downstream side of a light oil pump; and

an ignition timing control unit for regulating

ignition timing based on the type of the light oil, which is identified by the liquid type identification apparatus for a light oil.

[18] An automotive exhaust gas reduction method, comprising the steps of:

identifying the type and distillation properties of the light oil in a light oil tank or on the upstream side or downstream side of a light oil pump, by using any of the methods for identifying the liquid type of a light oil of claims 8 to 14, and

regulating an ignition timing based on the type of the light oil which is identified by the liquid type identification apparatus for a light oil.

[19] An automotive exhaust gas reduction apparatus comprising:

the above liquid type identification apparatuses for a light oil according to any of claims 1 to 7, which is provided within a light oil tank or on the upstream side or downstream side of a light oil pump; and

a light oil compression control unit for

regulating the compression ratio of the light oil based on the type of the light oil which is identified by the liquid type identification apparatus for a light oil.

[20] An automotive exhaust gas reduction method, comprising the steps of:

identifying the type and distillation properties of the light oil in a light oil tank or on the upstream side or downstream side of a light oil pump, by using any of the methods for identifying liquid type of a light oil of claims 8 to 14, and

regulating the compression ratio of the light oil based on the type of the light oil which is identified by the liquid type identification apparatus for a light oil.